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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,268	03/10/2004	Thomas E. Nelson	58151.U1	2952
408	7590	05/16/2005	EXAMINER	
LUEDEKA, NEELY & GRAHAM, P.C.			SUN, XIUQIN	
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KNOXVILLE, TN 37901			PAPER NUMBER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/797,268	Applicant(s) NELSON ET AL.	
	Examiner Xiuqin Sun	Art Unit 2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-22 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 10 is/are rejected.
- 7) ☒ Claim(s) 5 and 7-9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>08/25/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed on 08/25/2004 has been received; however, the reference "CSI Technology, Inc. A2120A1 Data Sheet" listed in the "other prior art-non patent literature document" section has not been considered by the examiner because it does not contain sufficient information. Specifically, it is short of a date which is required by MPEP 609.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hopkins et al. (U.S. Pat. No. 6507765) in view of Bechhoefer et al. (U.S. Pub. No. 20030065482).

With respect to claim 1, Hopkins et al. teach an analyzer for monitoring parameters of a machine comprising: a) a user input interface for receiving and transmitting a user input (col. 4, lines 59-67; col. 5, lines 1-20; col. 7, lines 4-10; col. 11, lines 64-67 and col. 12, lines 1-15); b) at least one analog input for receiving a raw analog signal having a magnitude (col. 5, lines 31-45); c) a conditioning circuit connected to the analog input for receiving and processing the raw analog signal and

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producing a conditioned analog signal, the conditioned analog signal being produced from the raw analog signal based on predetermined criteria, the predetermined criteria including an input limit which is satisfied when the raw analog signal satisfies the input limit (col. 7, lines 4-39); d) a data processor for receiving and processing the user input and controlling the analyzer based in part on the user input (col. 7, lines 4-10 and lines 56-67; col. 11; lines 24-37); e) an output for producing an output signal at least in part corresponding to the conditioned analog signal (col. 7, lines 56-67 and col. Col. 8, lines 36-53); g) the conditioning circuit including at least a qualifying circuit connected to the analog input for receiving and processing the raw analog signal and producing a qualified analog signal, the qualified analog signal being produced when the raw analog signal is qualified based on predetermined criteria (col. 7, lines 4-39); and h) the output for producing an output signal corresponding to the qualified analog signal (col. 7, lines 56-67; col. 11, lines 24-37).

With respect to claim 6, Hopkins et al. teach an analyzer for monitoring parameters of a machine comprising: a) a user input interface for receiving and transmitting a user input (col. 4, lines 59-67; col. 5, lines 1-20; col. 7, lines 4-10; col. 11, lines 64-67 and col. 12, lines 1-15); b) at least one analog input for receiving a raw analog signal having a magnitude (col. 5, lines 31-45); c) a conditioning circuit connected to the analog input for receiving and processing the raw analog signal and producing a conditioned analog signal, the conditioned analog signal being produced from the raw analog signal based on predetermined criteria, the predetermined criteria including an input limit which is satisfied when the raw analog signal is below the input

limit, the conditioning circuit having a selectable attenuator circuit for attenuating the raw analog signal when the input limit is exceeded (col. 7, lines 4-39); d) a data processor for receiving and processing the user input and controlling the analyzer based in part on the user input (col. 7, lines 4-10 and lines 56-67; col. 11, lines 24-37); and e) an output for producing an output signal at least in part corresponding to the conditioned analog signal (col. 7, lines 56-67 and col. 8, lines 36-53).

Hopkins et al. do not expressly mention that: said parameters of a machine include machine vibration; the analog input including at least a tachometer input for receiving a raw tachometer signal having a magnitude and a plurality of pulses having a cycle time corresponding to a speed of the machine.

Bechhoefer et al. teach a method and apparatus for performing vibration analysis for the purpose of machine monitoring (see Abstract), including: a plurality of sensors that generate analog input including at least a tachometer input for receiving a raw tachometer signal having a magnitude and a plurality of pulses having a cycle time corresponding to a speed of the machine (sections 0046, 0050, 0051, 0053, 0058 and 0059). The teaching of Bechhoefer et al. further includes: a qualifying circuit connected to the tachometer input for producing a qualified tachometer signal, the the qualified analog signal being produced when the raw analog signal is qualified based on predetermined criteria (sections 0089 and 0090).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of Bechhoefer et al. in the invention of Hopkins et al. in order to monitor machine performance by analyzing input signals

acquired from vibration and rotational speed measurements (Bechhoefer et al., Abstract and sections 0050 and 0051).

4. Claims 2-4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hopkins et al. (U.S. Pat. No. 6507765) in view of Bechhoefer et al. (U.S. Pub. No. 20030065482), as applied to claims 1 and 6 above, and further in view of Sabini et al. (U.S. Pub. No. 20030106375).

With respect to claims 2-4, Hopkins et al. and Bechhoefer et al. teach an analyzer that includes the subject matter discussed above. Hopkins et al. further teach: a microprocessor that implements the predetermined criterion and produces tachometer signals that are modified based on the criterion (col. 7, lines 4-17).

The combination of Hopkins et al. and Bechhoefer et al. does not mention expressly: said predetermined criteria include an amplitude criterion, the amplitude criterion being satisfied when the raw tachometer signal exceeds an amplitude threshold, the conditioning circuit producing a partially qualified tachometer signal corresponding to that portion of the raw tachometer signal that meets the amplitude criterion; said predetermined criteria include a time criterion, the time criterion being satisfied when the partially qualified tachometer signal has a cycle time higher than a predetermined time limit.

Sabini et al. disclose a method for identifying rotating bearing defect, and teach a step of providing predetermined criteria that include an amplitude criterion, the amplitude criterion being satisfied when the raw tachometer signal exceeds an amplitude threshold, a conditioning circuit producing a partially qualified tachometer

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signal corresponding to that portion of the raw tachometer signal that meets the amplitude criterion (section 0015); said predetermined criteria include a time criterion, the time criterion being satisfied when the partially qualified tachometer signal has a cycle time higher than a predetermined time limit (section 0015).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of Sabini et al. in the combination of Hopkins et al. and Bechhoefer et al. in order to perform further analysis on the tachometer signal in conjunction with other parameters of the machine, for example, by synchronizing a vibration frequency to a rotational speed generated by the tachometer (Sabini et al., section 0016).

With respect to claim 10, Hopkins et al. and Bechhoefer et al. teach an analyzer that includes the subject matter discussed above.

The combination of Hopkins et al. and Bechhoefer et al. does not mention expressly: a tachometer input for receiving a raw tachometer signal having a magnitude and a plurality of pulses having a cycle time corresponding to a speed of a machine.

Sabini et al. disclose a method for identifying rotating bearing defect, and teach a tachometer input for receiving a raw tachometer signal having a magnitude and a plurality of pulses having a cycle time corresponding to a speed of a machine (section 0015).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of Sabini et al. in the combination of Hopkins et al. and Bechhoefer et al. in order to monitor machine performance by

analyzing rotational speed signals generated by the tachometer (Sabini et al., section 0016).

Allowable Subject Matter

5. Claims 5 and 7-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. Claims 11-22 are allowed.

Reasons for Allowance

7. The following is an examiner's statement of reasons for allowance:

The primary reason for the allowance of dependent claim 5 is the inclusion of the limitation that an adjustable discriminator for receiving the comparison signal and the raw tachometer signal, comparing the magnitudes of the two received signals, and transmitting a partially qualified tachometer signal if the raw tachometer signal magnitude is greater than the comparison signal magnitude. It is this limitation found in the claim, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

The primary reason for the allowance of dependent claim 7 is the inclusion of the limitation that an adjustable discriminator for receiving the comparison signal and the raw tachometer signal, comparing the magnitudes of the two received signals, and transmitting a partially qualified tachometer signal if the raw tachometer signal magnitude is greater than the comparison signal magnitude. It is this limitation found in

the claim, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

The primary reason for the allowance of dependent claim 8 is the inclusion of the limitation that a second conditioning circuit connected to the second analog input for receiving and processing the second raw analog signal and producing a second conditioned analog signal based on a second predetermined criteria, the second predetermined criteria including a second input limit which is satisfied when the second raw analog signal is below the input limit, the second conditioning circuit having a second selectable attenuator circuit for attenuating the second raw analog signal when the second input limit is exceeded. It is this limitation found in the claim, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

The primary reason for the allowance of dependent claim 9 is the inclusion of the limitations that a second conditioning circuit connected to the second analog input for receiving and processing the second raw analog signal and producing a second conditioned analog signal based on a second predetermined criteria, the second predetermined criteria including a second input limit which is satisfied when the second raw analog signal is below the input limit, the second conditioning circuit having a second selectable attenuator circuit for attenuating the second raw analog signal when the second input limit is exceeded, and a summing circuit for receiving the conditioned analog signal and the second conditioned analog signal, producing a summation signal, the summation signal corresponding to the addition of the conditioned analog signal and

the second conditioned analog signal, and transmitting the summation signal. It is these limitations found in the claim, as they are claimed in the combination that have not been found, taught or suggested by the prior art of record, which make this claim allowable over the prior art.

The primary reason for the allowance of claims 11-15 is the inclusion of the limitation of: a conditioning circuit connected to the analog input for receiving and processing the raw analog signal and producing a conditioned analog signal, the conditioned analog signal being produced when the raw analog signal is conditioned based on predetermined criteria, the predetermined criteria including a machine amplitude criterion, the machine amplitude criterion being part of the user input and corresponding to a predetermined amplifier gain, the predetermined amplifier gain corresponding to the machine and being stored in a memory. It is this limitation found in each of the claims, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

The primary reason for the allowance of claims 16-19 is the inclusion of the limitation that a second conditioning circuit connected to the first and second analog inputs for receiving and processing the first and second raw analog signals and producing a second conditioned analog signal, the second conditioned analog signal being produced from at least one of the first and second raw analog signals based on a second predetermined criteria, the second predetermined criteria including the second machine amplitude criterion, the second machine amplitude criterion being part of the

user input and corresponding to a predetermined second channel amplifier gain, the predetermined second channel amplifier gain being stored in the memory. It is this limitation found in each of the claims, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

The primary reason for the allowance of claims 20-22 is the inclusion of the limitations that A second conditioning circuit connected to the first and second analog inputs for receiving and processing at least one of the first and second raw analog signals and producing a second conditioned analog signal, the second conditioned analog signal being produced from at least one of the first and second raw analog signals based on a second predetermined criteria, and a summing circuit for receiving the first and second conditioned signals, producing a summation signal, the summation signal corresponding to the addition of the first and second conditioned signals, and transmitting the summation signal. It is these limitations found in each of the claims, as they are claimed in the combination that have not been found, taught or suggested by the prior art of record, which make these claims allowable over the prior art.

Prior Art Citations

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a) Qian et al. (U.S. Pub. No. 20020052714 A1) is entitled to "System for analyzing signals generated by rotating machines".

Contact Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuqin Sun whose telephone number is (571)272-2280. The examiner can normally be reached on 6:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571)272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

XS
May 4, 2005


MICHAEL NGHIEM
PRIMARY EXAMINER

Xiuqin Sun
Examiner
Art Unit 2863